REMARKS

Reconsideration and continued examination is respectfully requested in view of the amendments and remarks.

Disposition of the Claims.

Claims 1-34 are pending in the instant application. Specifically, claims 1-22 and 24-34 have been rejected based on prior art, while claim 23 has been rejected as being indefinite.

Summary of Formal Rejection.

The Examiner has rejected claim 23 under 35 U.S.C. §112, second paragraph, as being indefinite. In particular, the Examiner asserts that he is unsure how the sensor can be both within the inner tube and in the flow path.

The Applicants have reviewed the application and amended claim 23 to more clearly point out and distinctly claim the Applicants' invention. In particular, claim 23 has been amended to recite that the sensor is located within the outside tube and in the flow stream. Applicants aver that no new matter has been added by this amendment. See specification page 12, line 25. The sensors according to the present invention are located along the inside surface of the outer tube, thereby placing the sensors in contact with fluid as it flows over the heated inside tube. Therefore, the sensor is both within the outside tube and

in the fluid flow stream as now claimed in claim 23. Accordingly, the Applicants believe that claim 23 now particularly points out and distinctly claims the subject matter which the Applicants consider their invention. Therefore, the Examiner is respectfully requested to withdraw his rejection of claim 23 under 35 U.S.C. §112, second paragraph.

Summary of prior art rejections.

The Examiner has rejected claims 1-6, 8-11, 13-14, 17, 19, 20, 22, 24-27, and 29-34 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 4,501,952 to Lehrke ("Lehrke"). Further, the Examiner has rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over the Lehrke reference in view of U.S. Patent 6,068,703 to Chen et al ("Chen"). Additionally, the Examiner has rejected claims 12, 15, 16, and 18 under 35 U.S.C. §103(a) as being unpatentable over Lehrke. Further, the Examiner has rejected claim 21 under 35 U.S.C. §103(a) as being unpatentable over the Lehrke reference taken in view of U.S. Patent 6,104,011 to Juliano ("Juliano"). Finally, the Examiner has rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable over the Lehrke reference taken in view of the U.S. Patent 5,178,651 to Balma et al. ("Balma")

Applicant's Newly Amended Claims are Not Anticipated By the Lehrke Reference.

The Examiner has rejected claims 1-6, 8-11, 13-14, 17, 19, 20, 22, 24-27, and 29-34 as being anticipated by the Lehrke reference.

The Examiner contends that Lehrke discloses a fluid heat exchanger with an outside tube placed around an inside tube defining a small passageway of annular cross section comprising a thermistor for monitoring and controlling the temperature of the fluid. The Examiner further contends the Lehrke reference discloses that the inner tube includes a heater coil placed within the inner tube and that a helically coiled wire is wrapped around the inner tube. Additionally, the Examiner asserts that even though it is not explicitly disclosed in Lehrke, the Examiner considers a microprocessor as commonplace in the art and thus implicitly disclosed by Lehrke. Finally, the Examiner states that heating thermistors, resistance sensors and thermocouples are considered to be equivalents and therefore included in the disclosure of Lehrke.

A review of the Lehrke reference reveals that the reference discloses that the inside tube has at least two straight heater coils placed within the tube. See column 3, lines 5-10. The reference further discloses that the heater coils are not capable of bending and, as such, they are not capable of

placement within the "U" bend section of the tube, thereby allowing this "U" bend section to go unheated. Therefore, it appears that the entire length of the inside tube of Lehrke is not heated. Lehrke also discloses that the thermistor housing 36 is in physical contact with heating element 14. See column 4, lines 24-25; Figures 4A and 4B.

In response, the Applicants have amended independent claims 1, 29, and 34 to recite the limitation that the inside tube of the present invention is heated along its entire length. Independent claim 19 has been amended to include the limitation that the sensor placement of the present invention is only in contact with the fluid, and therefore is not in physical contact with the heating element as disclosed in Lehrke. Applicants aver that no new matter has been introduced by virtue of these amendments. See specification page 12, lines 21-25; Figures 6 and 7.

The newly amended limitations of an inside tube that is heating along its entire length and a sensor arrangement that is not in physical contact with the heating elements of the inside tube is not anticipated by the Lehrke reference. As noted above, the Lehrke reference discloses that the heater coils located within the inside tube cannot be placed within the "U" bend in the tube and that the thermistors of Lehrke must be in physical contact with the heating element.

Since Lehrke teaches that the heater coils within the inside tube are straight and not capable of bending around the "U" bend section or other bends in the device the inside tube is not heated throughout its entire length. Only the straight portions of the inside tube of Lehrke are directly heated by the heater coils. Therefore newly amended independent claims 1, 29 and 34 are allowable over the cited prior art because the rapidly heatable inside tube of the claimed invention is heated throughout its entire length.

Additionally, the Lehrke reference discloses that the thermistor must be in physical contact with the heating element as noted above. Since the thermistor is in physical contact with the heater it is not capable of measuring an accurate temperature of the fluid as its readings are affected by the heat generated by the heater's direct contact with the temperature sensor.

In contrast, Applicants' sensors are capable of providing much more accurate readings as they are only in direct contact with the fluid and not the heating element. The sensors of the present invention are disposed directly in the fluid flow and only measure the temperature of the fluid and not the heating element. Therefore, newly amended claim 19 is allowable over the cited prior art because the temperature sensor of the claimed invention is in direct communication with only the fluid.

Accordingly, the Lehrke reference does not anticipate the points of novelty of the present invention; namely, a fluid heat exchanger having an inside tube heated throughout its entire length and at least one temperature sensor disposed inside said outside tube such that the temperature sensor is in direct sensing communication with only the fluid flowing between the outside and inside tubes.

Based on the foregoing, the Examiner is respectfully requested to withdraw his rejection of independent claims 1, 19, 29, and 34 as being anticipated by Lehrke and indicate allowance thereof. Further, the Applicants respectfully request that dependent claims 2-6, 8-11, 13-14, 17, 20, 22, 24-27, 30-33 be allowed by virtue of their respective dependencies to the amended independent claims.

Applicants' Newly Amended Claim 7 is Patentable Over the Lehrke Reference in View of the Chen Reference.

The Examiner has rejected dependent claim 7 under 35 U.S.C. §103(a) as being unpatentable over Lehrke in view of Chen et al.

Specifically, the Examiner contends that Lehrke discloses the invention substantially as claimed in claim 7; however, the Examiner admits that the Lehrke reference does not explicitly disclose an electropolished finish to the surfaces of the channel. As noted above, independent claim 1 which claim 7

depends therefrom has been amended to overcome the prior art cited by the Examiner. As such, dependent claim 7 should be allowable by virtue of its dependency to independent claim 1.

Based on the foregoing, the Examiner is respectfully requested to withdraw his rejection of dependent claim 7 as being unpatentable over Lehrke taken in view of Chen et al.

Applicants' Newly Amended Claims are Patentable as They are Not Obvious in View of the Lehrke Reference.

The Examiner has rejected claims 12, 15, 16, and 18 under 35 U.S.C. §103(a) as being obvious in view of Lehrke. Specifically, it is the Examiner's contention that Lehrke discloses the invention substantially as claimed except that instead of using a raised helical portion formed from the inside tube as is claimed that Lehrke uses a separate helical wire interposed between the inner and outer tubes which creates a raised region. The Examiner concludes that it would have been obvious to make the helical wire an integral part of the tube surface.

The Applicants would like to respectfully point out to the Examiner that raised regions in dependent claims 12, 15, 16, and 18 are not the result of the helical wire being an "integral part of the tube surface" as the Examiner asserts. Rather, the raised regions are utilized in an alternative embodiment of the

present invention "instead of wire". See specification page 10, line 15. Therefore, Applicants' raised regions are not the result of the combination of helical wire and the inside tube but rather the sole result of creating raised regions from the tube member itself. As such, the invention as claimed is not obvious when taken in view of Lehrke.

As noted above, claim 1 has been amended in order to distinguish the fluid heat exchanger of the present invention from the Lehrke reference. Therefore, dependent claims 12, 15, 16, and 18 would be allowable based upon their respective dependencies upon an allowable independent claim.

Based upon the foregoing, the Examiner is respectfully requested to withdraw his rejection of claims 12, 15, 16 and 18 as being unpatentable when taken in view of Lehrke.

Applicant's Newly Amended Claim 21 is Patentable Over the Lehrke Reference In View Of the Juliano Reference.

The Examiner has rejected dependent claim 21 under 35 U.S.C. §103(a) as being unpatentable over Lehrke in view of Juliano.

Specifically, the Examiner contends that Lehrke discloses the invention substantially as claimed except that Lehrke does not explicitly disclose a temperature sensor within the inner tube as is disclosed by Juliano. As noted above, independent

claim 19 which claim 21 depends therefrom has been amended to overcome the prior art cited by the Examiner. Accordingly, claim 21 is not obvious over Lehrke taken in view of Juliano.

Based on the foregoing, the Examiner is respectfully requested to withdraw his rejection of dependent claim 21 as being unpatentable over Lehrke taken in view of Juliano.

Claim 28 is Patentable Over the Lehrke Reference In View Of the Balma Reference.

The Examiner has rejected dependent claim 28 under 35 U.S.C. §103(a) as being unpatentable over Lehrke in view of Balma et al.

Specifically, the Examiner contends that Lehrke discloses, the invention substantially as claimed; however the Examiner admits the Lehrke reference does not show the sensor placement in a raised region of the outside tube as is depicted by Balma.

As noted above, independent claim 19 to which dependent claim 28 depends therefrom has been amended to overcome the prior art based upon the fact that the sensors are not in direct contact with the heater itself but only the fluid. Therefore, dependent claim 28 would be allowable based upon its respective dependency from an allowable independent claim.

Based on the foregoing, the Examiner is respectfully requested to withdraw his rejection of dependent claim 28 as being unpatentable over Lehrke taken in view of Balma et al.

Conclusion

By the present response, the Applicants have made amendments and provided arguments in support of their position that the cited references do not disclose specific structural elements neither shown nor suggested by the claimed invention and to make clear the manner in which those elements cooperate to provide the unique advantages of the present invention. In particular, the Applicants have provided arguments for allowance of independent claims 1, 19, 29, and 34 based on certain distinguishing structural limitations not found in the Lehrke, Chen, Juliano, and Balma references; namely, a rapid response electric heat exchanger with an inner heated tube that is heated along its entire length which is disposed inside an outer tube that defines an area for fluid to flow through with temperature sensors placed only in contact with the fluid flowing between the inner and outer tubes. Based on the foregoing, dependent claims 2-18, 20-22, 24-28, and 30-33 are allowable by virtue of their respective dependencies to the above independent claims. Accordingly, the application is in a condition for allowance and expeditious notice thereof is earnestly solicited.

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If the Examiner has any comments or suggestions which would place the application in still better condition for allowance, he is respectfully requested to call the undersigned attorney collect.

Respectfully submitted,

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Date

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